MI FluFocus

Influenza Surveillance and Avian Influenza Update

Bureau of Epidemiology
Bureau of Laboratories

Michigan Department of Community Health
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New updates in this issue:

- **Michigan Surveillance:** Influenza activity continues to be sporadic, with only 2009 influenza A H1N1 being identified at the MDCH Bureau of Laboratories.
- **National Surveillance:** Influenza activity remained steady; no states reported widespread activity.
- **International Surveillance:** 2009 influenza A H1N1 activity remains variable across the globe.

****2009 Influenza A (H1N1) virus Updates****

Please continue to reference the MDCH influenza website at www.michigan.gov/flu for additional 2009 H1N1 information. Local health departments can find guidance documents in the MI-HAN document library. In addition, additional laboratory-specific information is located at the Bureau of Laboratories H1N1 page at http://www.michigan.gov/mdch/0,1607,7-132-2945_5103-213906--,00.html.

****Influenza Surveillance Reports****

Michigan Disease Surveillance System: During the week ending January 30, aggregate influenza, individual influenza and 2009 novel influenza cases remained steady near the previous week's levels. Case reports are comparable with levels seen at this time last year, except for individual influenza counts, which are lower.

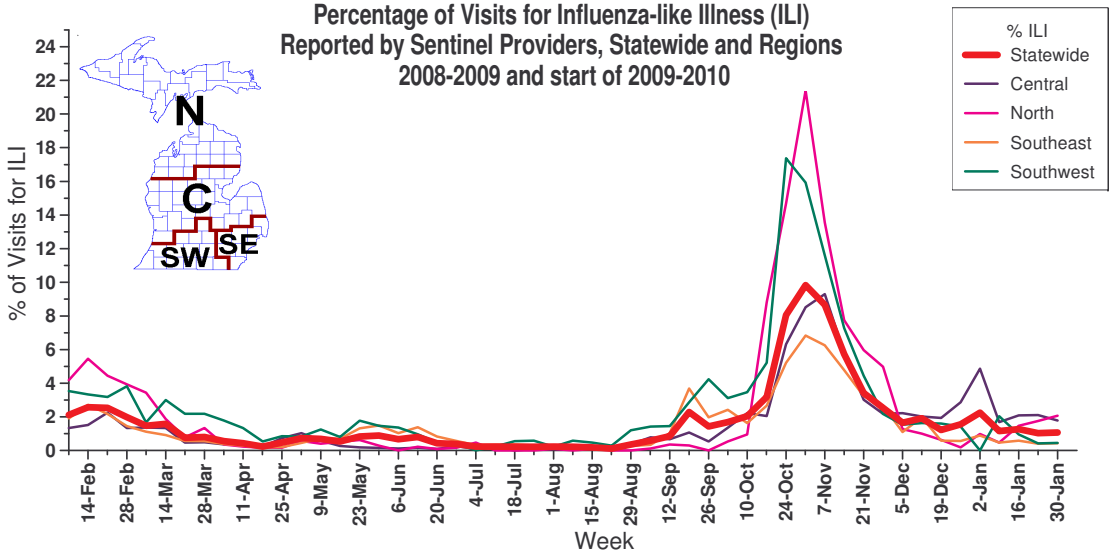
During the week of January 24-30, 2010, 8719 cases of flu-like illness and confirmed and probable cases of seasonal and novel influenza were reported in Michigan. 27 hospitalizations and 1 death associated with influenza were reported during this time. This report is updated every Tuesday by 5:00 pm and can be accessed at "Current H1N1 Activity" on this website: http://www.michigan.gov/h1n1flu.

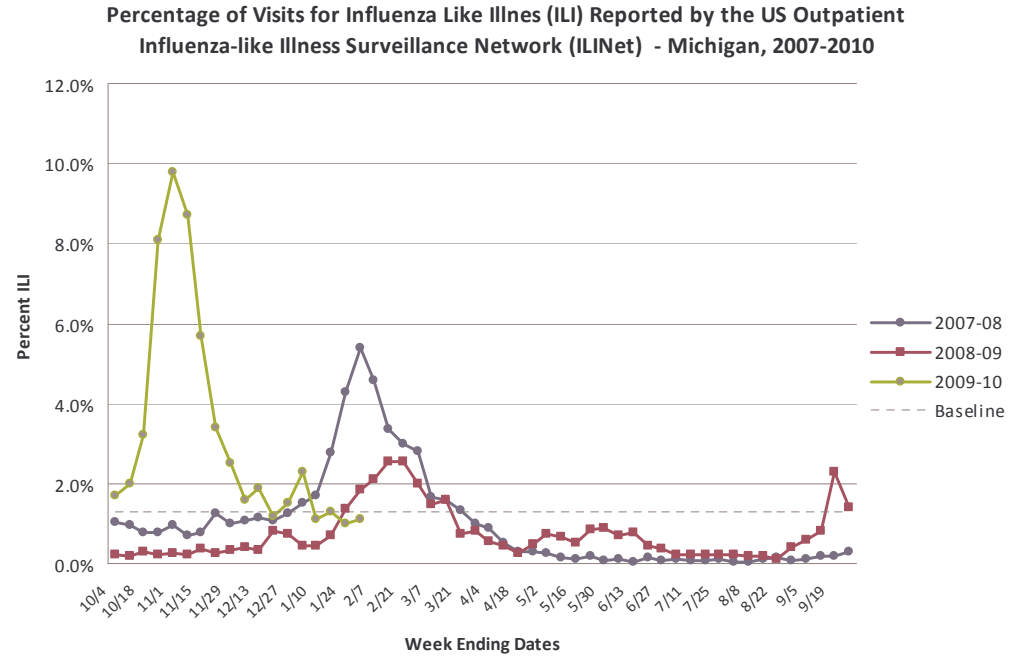
Emergency Department Surveillance: Emergency department visits from constitutional complaints remained steady near the previous week's levels, while respiratory complaints increased slightly. Both constitutional and respiratory complaints are comparable to what was seen at this time last year. In the past week, there were three constitutional alerts in the N(3) Influenza Surveillance Region and two respiratory alerts in the N(1) and C(1) Influenza Surveillance Regions.

Over-the-Counter Product Surveillance: Overall, OTC products saw mixed sales for the previous week. Chest rubs saw a slight increase, thermometer sales saw a slight decrease, and the remaining indicators held steady near previous week's levels. Even though their weekly change has been negligible, children's electrolytes sales have been trending upward very slowly over the past month. All indicator sales are consistent with numbers seen this time last year.

Sentinel Provider Surveillance (as of February 4, 2010): During the week ending January 30, 2010, the proportion of visits due to influenza-like illness (ILI) remained below baseline but slightly increased to 1.1% overall. Thirty-three sentinel sites provided data for this report; 110 patient visits due to ILI were reported out of 10,405 office visits. Activity increased in one surveillance region: North (2.1%); remained the same in two regions: Southwest (0.4%) and Southeast (0.3%); and decreased in the remaining region: Central (1.8%). Please note that these rates may change as additional reports are received.

As part of pandemic influenza surveillance, CDC and MDCH highly encourage year-round participation from all sentinel providers. New practices are encouraged to join the sentinel surveillance program today! Contact Cristi Carlton at 517-335-9104 or CarltonC2@michigan.gov for more information.





Laboratory Surveillance (as of January 30): During January 24-30, MDCH Bureau of Laboratories identified one 2009 Influenza A (H1N1) isolate. For the 2009-2010 season (starting on October 4, 2009), MDCH BOL has identified 601 influenza isolates:

- 2009 Influenza A (H1N1): 600
- Influenza B: 1

14 sentinel labs reported for the week ending January 30, 2010. 5 labs reported sporadic Flu A activity (SE, C). 9 labs reported no flu A positives (SE, SW, C, N). All 14 labs reported no Flu B activity (SE, SW, C, N). 10 labs reported low or increasing #'s of RSV positives (SE, SW, C, N), while 2 labs reported moderately elevated #'s of RSV positives (SE, C).

Michigan Influenza Antigenic Characterization (as of February 4): One novel H1N1 influenza A virus from Michigan has undergone further characterization at the CDC. This virus was characterized as A/California/07/2009 (H1N1)-like, which is the recommended strain for the H1 component of the 2010 Southern Hemisphere vaccine.

Michigan Influenza Antiviral Resistance Data (as of February 4): Results are currently not available for antiviral resistance at CDC for the 2009-2010 season.

Antiviral resistance testing takes months to complete and cannot be used to guide individual patient treatment. However, CDC has made recommendations regarding the use of antivirals for treatment and prophylaxis of influenza. The guidance is available at http://www.cdc.gov/H1N1flu/recommendations.htm.

Influenza-Associated Pediatric Mortality (as of February 4): Five 2009 H1N1 influenza-associated pediatric mortalities (SE(3), SW, N) have been reported to MDCH for the 2009-2010 influenza season.

***CDC has asked states for information on any pediatric death associated with influenza. This includes not only any pediatric death (<18 years) resulting from a compatible illness with laboratory confirmation of influenza, but also any unexplained pediatric death with evidence of an infectious process. Please immediately call MDCH to ensure proper specimens are obtained. View the complete MDCH protocol online at http://www.michigan.gov/documents/mdch/ME_pediatric_influenza_guidance_v2_214270_7.pdf.

Influenza Congregate Settings Outbreaks (as of February 4): Seven congregate setting outbreaks with confirmatory novel influenza A H1N1 testing (2SE, 3 SW, 1C, 1N), and two outbreaks associated with positive influenza A tests (1C, 1N) have been reported to MDCH for the 2009-2010 influenza season. These are 8 school facilities and 1 long term care facility.

During fall 2009, 567 influenza-related school and/or district closures in Michigan (Public Health Preparedness Region 1 - 55, Region 2N - 4, Region 2S – 8, Region 3 - 54, Region 5 - 153, Region 6 - 100, Region 7 - 109, Region 8 - 84) were reported.

National (CDC [edited], January 29): During week 3 (January 17-23, 2010), influenza activity remained at approximately the same levels this week in the U.S. 164 (4.6%) specimens tested by U.S. World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System (NREVSS) collaborating laboratories and reported to CDC/Influenza Division were positive for influenza. All subtyped influenza A viruses reported to CDC were 2009 influenza A (H1N1) viruses. The proportion of deaths attributed to pneumonia and influenza (P&I) was above the epidemic threshold. Five influenza-associated pediatric deaths were reported. Four deaths were associated with 2009 influenza A (H1N1) virus infection and one was associated with an influenza A virus for which the subtype was undetermined. The proportion of outpatient visits for influenza-like illness (ILI) was 1.7% which is below the national baseline of 2.3%. Two of the 10 regions (Regions 4 and 9) reported ILI equal to their region-specific baseline. No states reported widespread influenza activity, five states reported regional influenza activity, Puerto Rico and nine states reported local influenza activity, the District of Columbia, Guam, and 33 states reported sporadic influenza activity, and the U.S. Virgin Islands and three states reported no influenza activity.

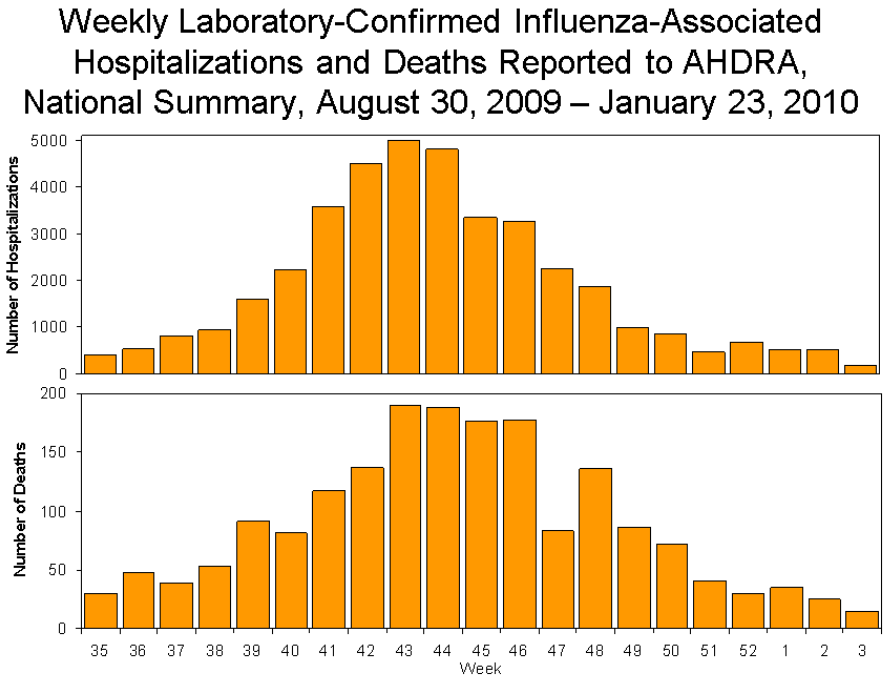
To access the entire CDC weekly surveillance report, visit http://www.cdc.gov/flu/weekly/fluactivity.htm

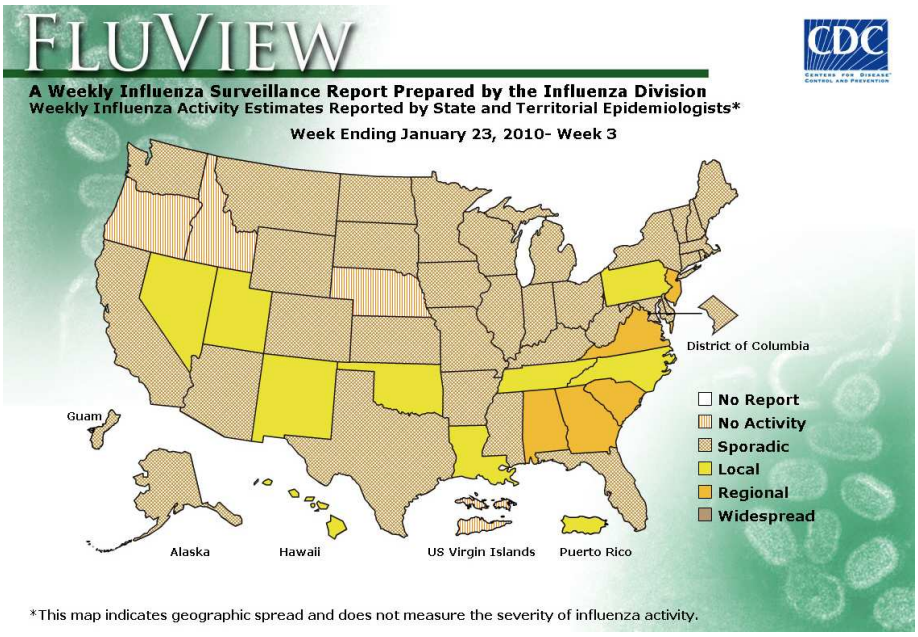
From http://www.cdc.gov/h1n1flu/updates/us/#totalcases:

U.S. Influenza and Pneumonia-Associated Hospitalizations and Deaths from Aug 30, 2009–Jan 23, 2010

Cases Defined by	Hospitalizations	Deaths
Influenza Laboratory-Tests**	39,387	1,857

**States report weekly to CDC either 1) laboratory-confirmed influenza hospitalizations and deaths or 2) pneumonia and influenza syndrome-based cases of hospitalization and death resulting from all types or subtypes of influenza. Although only the laboratory confirmed cases are included in this report, CDC continues to analyze data both from laboratory confirmed and syndromic hospitalizations and deaths.





International (WHO, January 29): Pandemic (H1N1) 2009: During the weeks 52-53, pandemic influenza A (H1N1) 2009 activity in the northern hemisphere continued to decrease. In tropical regions of the Americas and Asia, influenza activity was variable while activity in the southern hemisphere was sporadic.

In the northern hemisphere, widespread outbreaks of pandemic influenza A (H1N1) 2009 were reported in a few countries in central and southeastern Europe and in parts of Asia. In the United States of America and Canada activity decreased. Some countries in central America reported pandemic virus circulation and variable pandemic activity was reported in a few countries in the southern hemisphere.

Widespread outbreaks were reported in Costa Rica, Croatia, Ecuador, Georgia, Greece, Israel, Japan, Morocco, Panama, Republic of Moldova, Slovenia, Sri Lanka, Switzerland, Tunisia and Venezuela.

Regional outbreaks were reported in Argentina, Austria, Bahamas, Brazil, China, Columbia, Estonia, France, Germany, India, Latvia, Madagascar, Mongolia, Netherlands, Norway, Poland, Romania, Serbia, Turkey, United States of America and Ukraine.

Local levels of pandemic influenza A (H1N1) activity were reported in Albania, Czech Republic, Iran (Islamic Republic of), Italy, Paraguay, Russian Federation, Slovakia, Spain, Sweden and United Kingdom.

Sporadic pandemic influenza A (H1N1) 2009 activity was reported in Belarus, Belgium, Bulgaria, Canada, Cape Verde, Chile, China Hong Kong Special Administrative Region, Cuba, Cyprus, Denmark, Finland, Hungary, Lithuania, Luxembourg, Mexico, New Zealand, Portugal and Thailand.

SEASONAL INFLUENZA: The level of seasonal influenza activity was generally low with the exception of China where increased influenza B activity was reported. Sporadic seasonal influenza activity was observed in Afghanistan (H1), Cambodia (B), Canada (H3,B), China Hong Kong Special Administrative Region (H3,B), Iran (Islamic Republic of) (B), Russian Federation (H1,H3,B), Tunisia (B), Turkey (H3,B) and United States of America (B). Australia, Azerbaijan, Cameroon, Dominica, Kenya and Uzbekistan reported no influenza activity.

MDCH reported **SPORADIC INFLUENZA ACTIVITY** to the CDC for the week ending January 30, 2010.

For those interested in additional influenza vaccination and education information, the MDCH *FluBytes* is available at http://www.michigan.gov/mdch/0,1607,7-132-2940_2955_22779_40563-125027--,00.html.

Avian and Novel Influenza Activity

WHO Pandemic Phase: Phase 6 – characterized by increased and sustained transmission in the general population. Human to human transmission of an animal or human-animal influenza reassortant virus has caused sustained community level outbreaks in at least two WHO regions.

National, Research (Iowa State University press release [edited], February 3): Antiviral drugs block influenza A viruses from reproducing and spreading by attaching to a site within a proton channel necessary for the virus to infect healthy cells, according to a research project led by Iowa State University's Mei Hong and published in the Feb. 4 issue of the journal Nature.

Hong, Iowa State's John D. Corbett Professor of Chemistry and an associate scientist for the U.S. Department of Energy's Ames Laboratory, said the findings clarify previous, conflicting studies and should pave the way to development of new antiviral drugs against influenza viruses, including pandemic H1N1.

Two papers published by Nature in 2008 came to different conclusions about where the antiviral drug amantadine binds to a flu virus and stops it from infecting a healthy cell. A paper based on X-ray studies concluded the drug attached to the lumen of the proton channel, the area inside the channel, and stopped the virus by blocking the channel. Another paper based on solution nuclear magnetic resonance (NMR) technology concluded the drug attached to the surface of the virus protein near the proton channel and stopped the virus by indirectly changing the channel structure.

Hong's research concluded that when amantadine is present at the pharmacologically relevant amount of one molecule per channel, it attaches to the lumen inside the proton channel. But the paper also reports that when there are high concentrations of amantadine in the membrane, the drug will also attach to a second site on the surface of the virus protein near the channel.

"Our study using solid-state NMR technology unequivocally shows that the true binding site is in the channel lumen, while the surface-binding site is occupied only by excess drug," Hong said. "The previous solution NMR study used 200-fold excess drug, which explains their observation of the surface-binding site. The resolution of this controversy means that medical chemists can now try to design new drugs to target the true binding site of the channel."

Here's how a flu virus uses its proton channel and how amantadine blocks that channel: The virus begins an infection by attaching itself to a healthy cell. The healthy cell surrounds the flu virus and takes it inside the cell through a process called endocytosis. Once inside the cell, the virus uses a protein called M2 to open a channel to the healthy cell. Protons from the healthy cell flow through the channel into the virus and raise its acidity. That triggers the release of the virus' genetic material into the healthy cell. The virus hijacks the healthy cell's resources and uses them to reproduce and spread. When amantadine binds to and blocks the M2 proton channel, the process doesn't work and a virus can't infect a cell and spread.

The researchers also found that amantadine spins when it binds to the inside of the proton channel. That means it doesn't fill the channel. And Hong said that leaves room for development of other drugs that do a better job blocking the channel, stopping the flu and evading development of drug resistance.

International, Avian (Antara News [edited], January 29): Bird flu (Avian Influenza or the H5N1) virus has stricken 3 subdistricts in East Lampung District [Indonesia], killing at least 1176 chickens.

"In the current rainy season, chickens are prone to various diseases, including bird flu," Dewanto, head of the East Lampung district animal health unit, said here on Friday [29 Jan 2010].

Some 1176 chickens had died in 7 villages since early January 2010, while in 2009 there had been only 708 dead chickens in 11 villages. The affected villages include Sukadana, Purbolinggo, and Marga Tiga, East Lampung.

Michigan Wild Bird Surveillance (USDA, as of February 4): For the 2009 testing season (April 1, 2009-March 31, 2010), HPAI subtype H5N1 has not been recovered from any of the 111 Michigan samples tested to date, including 58 live wild birds, 39 hunter-killed birds and 14 morbidity/mortality specimens. H5N1 HPAI has not been recovered from 17,740 samples tested nationwide. For more information, visit the National HPAI Early Detection Data System at http://wildlifedisease.nbii.gov/ai/.

To learn about avian influenza surveillance in Michigan wild birds or to report dead waterfowl, go to Michigan's Emerging Disease website at http://www.michigan.gov/emergingdiseases.

Please contact Susan Peters at PetersS1@Michigan.gov with any questions regarding this newsletter or to be added to the weekly electronic mailing list.

Contributors

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Table 1. H5N1 Influenza in Poultry (Outbreaks up to January 31, 2010)

(Source: http://www.oie.int/downld/AVIAN%20INFLUENZA/A_AI-Asia.htm Downloaded 2/3/10)

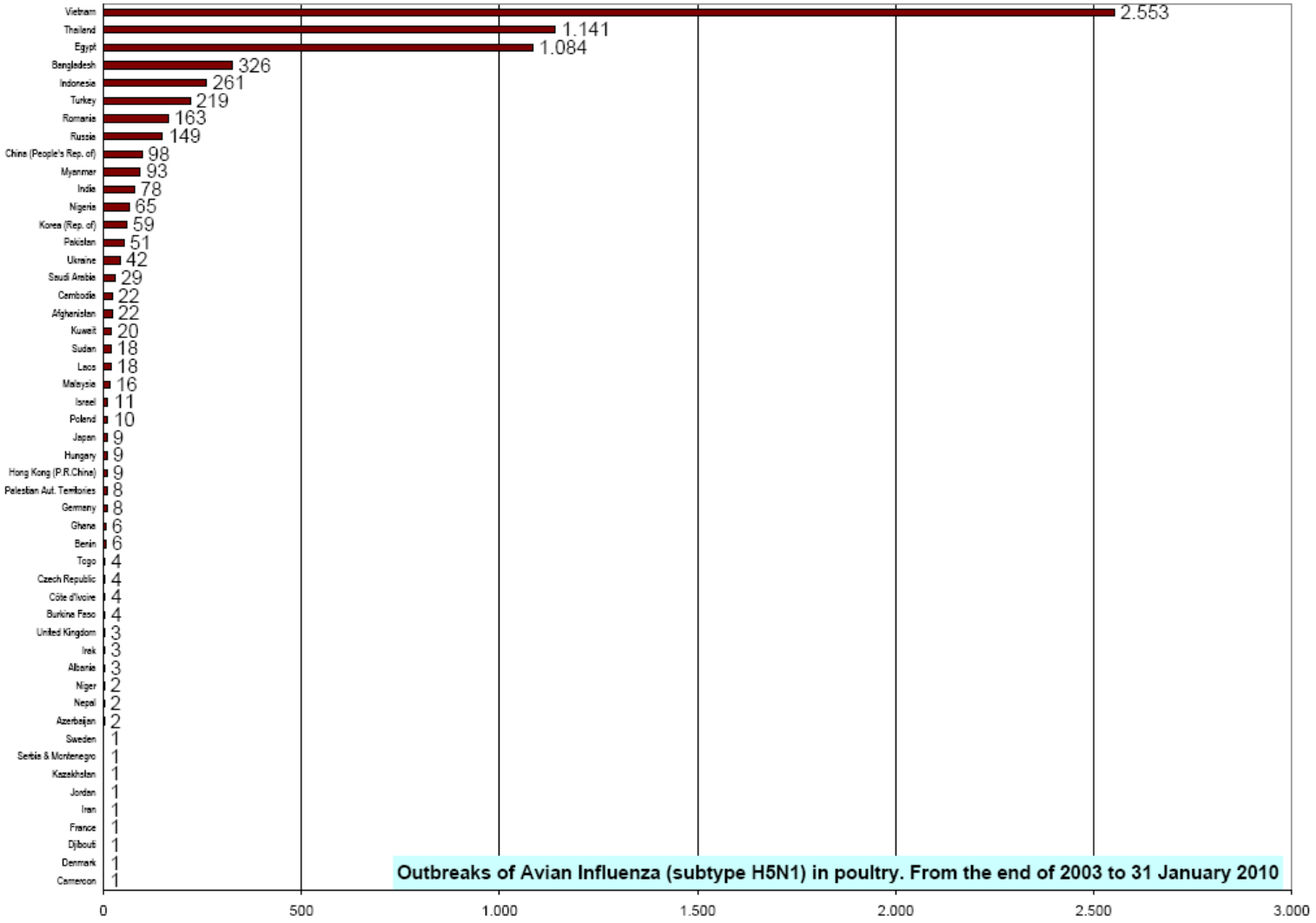

Table 2. H5N1 Influenza in Humans (Cases up to January 28, 2010)

(http://www.who.int/csr/disease/avian_influenza/country/cases_table_2010_01_28/en/index.html Downloaded 1/29/2010)

Cumulative number of lab-confirmed human cases reported to WHO. Total number of cases includes deaths.

Country	2003		2004		2005		2006		2007		2008		2009		2010		Total	
	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths
Azerbaijan	0	0	0	0	0	0	8	5	0	0	0	0	0	0	0	0	8	5
Bangladesh	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Cambodia	0	0	0	0	4	4	2	2	1	1	1	0	1	0	0	0	9	7
China	1	1	0	0	8	5	13	8	5	3	4	4	7	4	0	0	38	25
Djibouti	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
Egypt	0	0	0	0	0	0	18	10	25	9	8	4	39	4	4	0	94	27
Indonesia	0	0	0	0	20	13	55	45	42	37	24	20	20	19	0	0	161	134
Iraq	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	0	3	2
Lao People's Democratic Republic	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	2	2
Myanmar	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Nigeria	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1
Pakistan	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	3	1
Thailand	0	0	17	12	5	2	3	3	0	0	0	0	0	0	0	0	25	17
Turkey	0	0	0	0	0	0	12	4	0	0	0	0	0	0	0	0	12	4
Viet Nam	3	3	29	20	61	19	0	0	8	5	6	5	5	5	0	0	112	57
Total	4	4	46	32	98	43	115	79	88	59	44	33	72	32	4	0	471	282